SIEMENS

POLYDOROS SX 50/80

RX

Start-up Instructions

SIRECON 2 Connection

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General Remarks

- This document is applicable for the following generators:
  POLYDOROS SX 50/80

The SIRECON 2 connection is an expansion to the basic generator (see generator installation instructions) and is comprised of the D270 board, the D271 assembly, the multiplier extension cable as well as the connections parts and installation materials.

Required Documents

- TV-I.I. A Connection Wiring Diagram: X1768
- POLYDOROS SX Wiring Diagram: X2075
- POLYDOROS SX Start-up Instructions: RX63-050.034.10...

For SIRCAM:

- SIRCAM 103 Wiring Diagram G5129 or
  SIRCAM 106 Wiring Diagram G5091

The following documents are needed to carry out the image quality acceptance test for Fluoro and DFR/DR systems:

- Measuring Instructions RXD0-000.074.01.
- Test Certificate RXD0-000.037.01.
- List of nominal values RXD0-000.075.01.

Required Tools and Test Equipment

- Standard installation tool kit	
- Service PC	per ARTD, Parts 1, 3, 1.0
- PC connection cable, 5 m	99 00 440 RE999
- 2-channel memory oscilloscope, TEKTRONIX 2232	97 02 234 Y3155
- Precision copper filter, 2.1 mm	99 00 598 XE999
- Cu filters, set	44 06 120 RV090
- Resolution test, Type 41/42	28 71 820 RE999
- 17µm copper strips	11 67 662 G5247
- Digital multimeter, FLUKE 8060A	97 02 101 Y4290
- mAs meter	81 60 400 RE999
- kV/dose meter, PTW-NOMEX	97 08 637 Y0388
- Ground wire test instrument	44 15 899 RV090

CAUTION

When using the oscilloscope, the ground wire in the power cable may not be disconnected under any circumstances. For measurements in which any ground loops may be present which may cause the measurement result to be adversely affected, use the TEK isolating amplifier and the triggering option.

Safety-technical Information

The "Safety-technical Information" contained in generator installation instructions must be observed.

- Checks or adjustments which must be carried out under radiation are labeled in the instructions with the radiation warning symbol ☢ . While these work steps are being carried out, observe the appropriate radiation protection measures (see TI 216)

Remarks Regarding Start-up

- With systems which have been preassembled and tested at the factory per the BZ (can be seen from the accompanying "Test Certificate, Jumper Protocol" in the Register labeled "Protocol"), only very brief checks and adjustments need to be carried out.
- Enter the results from the measurements labeled with "≪ " in the Test Certificate in the column marked "Start-up Measurement Value".

NOTICE

Switch on the dose meter at least 15 minutes prior to the measurement and then calibrate it.

CAUTION

No additional filter may be selected at the collimator.

Image Quality in Fluoroscopy Systems

Prerequisites and General Remarks Regarding Filling Out the IQ Test Certificate for Fluoroscopy Systems:

Beam geometry (collimation and centering) of the application equipment must be in order.

When filling out the **"Test Certificate / Fluoro and DFR/DR Systems",** RXD0-000.037.01... observe the following:

- In Chapter 1, enter the Setting Instructions containing the data for fluoroscopy in the IQ tests used for start-up.
- In Chapter 1.1, enter the customer data and the BZ Number.
- In Chapter 1.2, enter the configured components along with their designation. Part No. and Serial No.
- In Chapter 1.3, list the test equipment used along with designation and Serial No. and the date until which the calibration is still valid.
- In Chapter 2, enter the data from the configured image intensifier.
- After each measurement, enter the results in the "Test Certificate/Fluoro and DFR/DR-Systems".
- Compare the measurement results with the reference values.
- If tolerances are exceeded, determine the reason and the error or correct the incorrect setting before continuing with the checks. Otherwise it is possible that subsequent measurements will be adversely influenced.
- Enter the BZ number and the data on each page of the "Test Certificate/Fluoro and DFR/DR Systems" to assure that there will be clear organization of the certificate pages.
- There may not be any empty fields in the completed certificate. Enter n.a. (not applicable) in fields in which no entry can be made. Fields which can only be filled in during customer start-up are marked in the certificate as such.
  Pencil may not be used to fill out the certificate; do not use Tippex to make corrections.
- Record the start-up instructions which are used for customer start-up. These contain information pertaining to performance of IQ texts and must be recorded in the "Test Certificate/Fluoro and DFR/DR Systems" in Chapter 1.
- The tester at the factory and the tester carrying out the start-up must sign and date the "Test Certificate/Fluoro and DFR/DR Systems" in Chapter 1-1.
- Cross out incorrect entries and write the correct value next to it along with the date and the tester’s initials.

At the Conclusion of the Test:

- Leave the "Test Certificate/Fluoro and DFR/DR Systems" RXD0-000.037.01... with the system and file it in Register 9 of the System Binder.
  If the System Binder is not available, file the Test Certificate in Register 9 of the Generator Binder.

Notes on the VIDOMATIC P

- For KK version systems, 2 fluoroscopy characteristic curves can be programmed (Fluoro 1 and Fluoro 2).
- For systems in RAS version, up to 4 fluoroscopic characteristic curves can be programmed if they can be selected from the unit (Fluoro 1. . . Fluoro 4).
- Dose-saving zoom can be programmed with existing iris diaphragm.
- Customer-specific fluoroscopy curves can be generated within the range of C80...C99.

Normal fluoroscopy (max. 450 W)

- Can be selected from fluoroscopy characteristic curves in the firmware (C00, C01, C02, C03, C10, C11)

High-contrast fluoroscopy (max. 1200 W, with modified high-voltage generator, as from Serial No. 01056, max. 2000 W)

- Can be selected from fluoroscopy characteristic curves in the firmware (C40, C41, C42, C50, C60, C61, C62, C63, C64, C65)

Therapy simulation

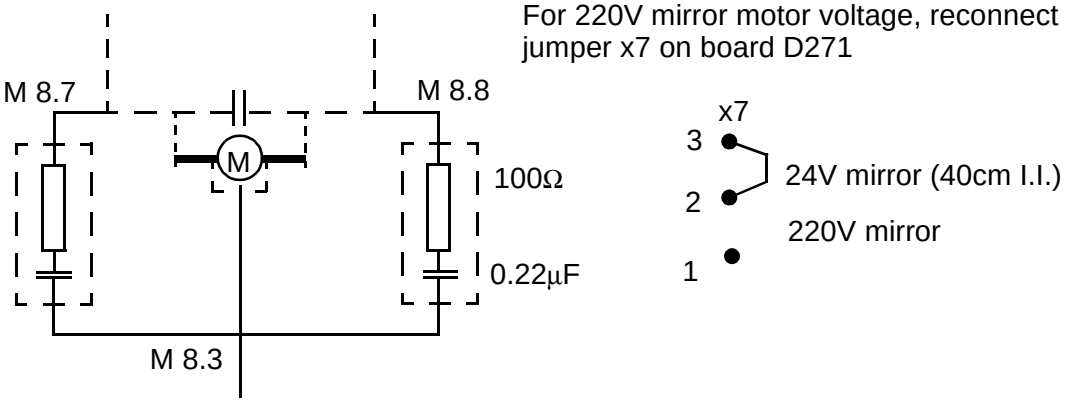
- It is possible to program 2 fluoroscopy curves which can be selected from:
  - fluoroscopy characteristic curves in the firmware (C40, C41, C42, C50, C60, C61, C62, C63, C64, C65)

Suppression of light distributor (220 V, not for I.I.40)

NOTICE

Voltage peaks caused by switching off the motor voltage of the mirror motor in the light distributor result in generator interferences

- For the reason, generally incorporate two RC elements, Part No.31 33 147 B2003 parallel to the motor.



Fluoroscopic dose rate (Excerpt from "Test Certificate for Fluoro and DFR/DR Systems")

Basic info on dose/dose rate measurement on image intensifier workstations

For dose measurement at the I.I. input (K_B) or dose rate measurement at the I.I. input ($\dot{K}_B$), attach the dose measuring chamber centrally to the radiation field, as close as possible to the I.I.; in the case of spotfilm devices, place it in the cassette shaft. If this is not possible, measure the dose (K_{Tg}) or the dose rate ($\dot{K}_{Tg}$) in front of the attenuating layers:

- With OT units on the tabletop
- With UT units on the spotfilm device rear panel
- With C-arm units on the grid

Using the correction factor m (unit attenuation factor), the value at the I.I. input is calculated.

The unit attenuation factor contains all attenuating layers between the patient and the image receptor, including the distance factor; it is indicated in the unit test certificates and can also be calculated by multiplication of the attenuation factors of all individual layers.

The radiation attenuation of 6% resulting from the dose measuring chamber must be taken into account as well (factor 0.94).

Determination of the dose/dose rate directly at the I.I. input

	Dose	Dose rate
Meas. chamber in the I.I. plane	$K_B = K_{Bg} \times 0{,}94$	$\dot{K}_B = \dot{K}_{Bg} \times 0{,}94$
Meas. chamber in front of attenuating layers	$K_B = \frac{K_{TG} \times 0{,}94}{m}$	$\dot{K}_B = \frac{\dot{K}_{Tg} \times 0{,}94}{m}$

Special case 1: Dose rate measurement if the ADC measuring field is larger than the dose measuring chamber:

Allow the ADC to adjust with 2.1 mm Cu prefiltration, change over to STOP ▽, now place the dose measuring chamber in the beam path and measure the dose rate. The factor of 0.94 must not be taken into account in this case.

Special case 2: Dose measurement if the dominant is larger than the dose measuring chamber:

Place 2.1 mm Cu and the dose measuring chamber in the beam path, release an exposure and measure the dose (KBg or KTg) and the mAs value (Qg1). Remove the dosimeter from the beam path, release an exposure and measure the mAs value (Qg2). Calculate the dose at the I.I. input (KB)

$$K_B = K_{Bg} \times \frac{Q_{g2}}{Q_{g1}} \quad ; \quad K_B = \frac{K_{Tg}}{m} \quad \frac{Q_{g2}}{Q_{g1}}$$

Determining the unit attenuation factor from the individual attenuation factors

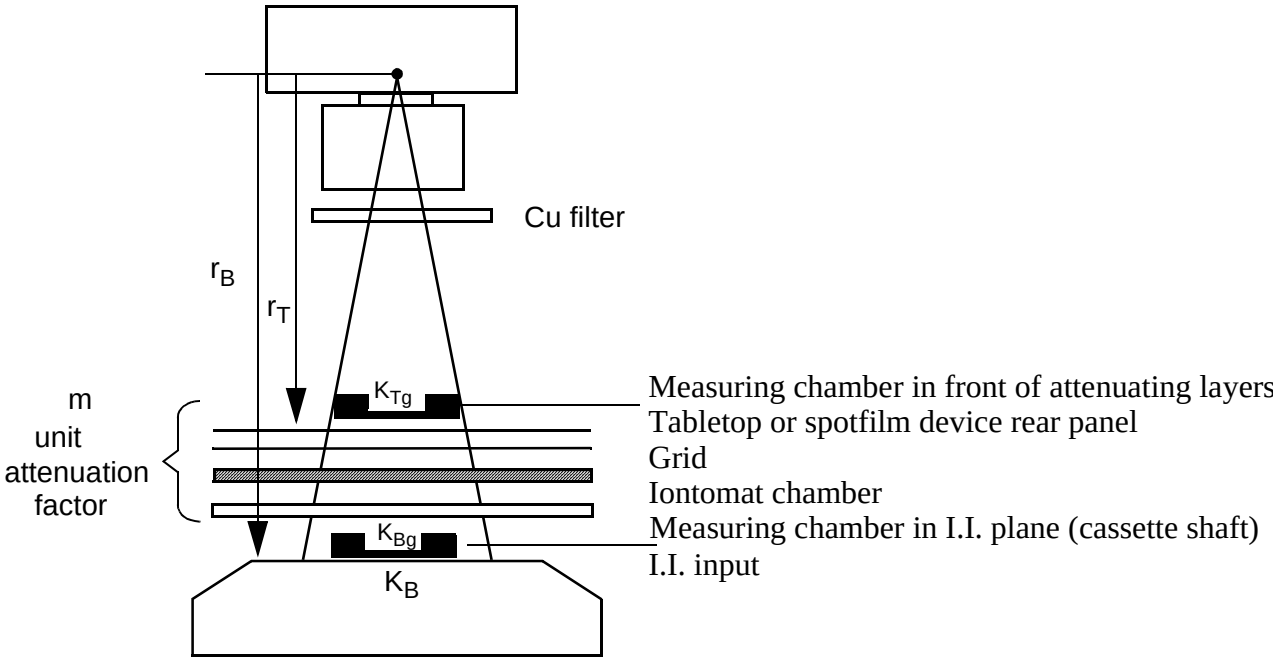
Attenuation factor of tabletop, spotfilm device rear panel etc. m_T

Attenuation factor of scattered radiation grid m_R

Attenuation factor of Iontomat chamber m_I

Attenuation factor distance factor $m_A = \left(\frac{r_B}{r_T}\right)^2$

Unit attenuation factor m = mT x mR x m? x mA . . . . . .



$K_B/\dot{K}_B$ = Dose/dose rate directly at the I.I. input

$K_{Bg}/\dot{K}_{Bg}$ = Measured dose/dose rate in the I.I. plane

$K_{Tg}/\dot{K}_{Tg}$ = Measured dose/dose rate in front of the attenuating layers

r_B = Source-image receptor distance

r_T = Distance between source and beginning of the attenuating layers

Formulas for calculating the dose/dose rate in the measuring plane for the dose/ dose rate setting

During setting, the dose or dose rate required directly at the I.I. input must be converted into the measuring plane (I.I. plane or in front of the attenuating layers). For this, use the modified formulas. .

		Dose	Dose rate
Meas.chamb. in I.I.plane	$K_{Bg}=$	$\frac{K_B}{0.94}$	$\dot{K}_{Bg}=\frac{\dot{K}_B}{0.94}$
Meas.chamber in front of attenuating layers	$K_{Tg}=$	$\frac{K_B \times m}{0.94}$	$\dot{K}_{Tg}=\frac{\dot{K}_B \times m}{0.94}$

Remark: The radiation attenuation resulting from the dose measuring chamber is already taken into account during setting
(for adjustment: remove the dose measuring chamber from the beam path).
Do not use the factor of 0.94 for calculating the dose rate to be set.If the dose/ dose rate is checked (not set), the factor of 0.94 must be taken into account.

Example for determining the correction factor

Correction factor m (total) =
(source-I.I. distance/source-measuring chamber distance)^2
x m-factor (Iontomat camber) x m-factor (Raster)
x m-factor (tabletop etc., if between dose measuring chamber and I.I.) etc.

- Distance correction factor (m_A) =

$$\left(\frac{\text{source-I.I. distance}(r_B)}{\text{source-meas. chamber distance}(r_T)}\right)^2 \quad \text{Example:} \left(\frac{100}{92.5}\right)^2 = 1.17$$

- Grid correction factor (m_R) = 1.7
- IONTOMAT chamber correct. factor (m_I) = 1.1
- Tabletop correction factor (m_T) = 1.1

When setting the dose/dose rate, multiply the dose/dose rate required at the I.I. input by the correction factors.

e.g. 174 nGy/s x (m_A x m_R x m_I x m_T)
174 nGy/s x (1.17 x 1.7 x 1.1 x 1.1) =
174 nGy/s x 2.4 = 408 nGy/s

(1µR=8.7 nGy)

Record the correction factor m in Chapter 4.1 of the "Test Certificate for DL and DFR/DR Systems".
The test certificate is filed in Register 9 of the System or Generator Binder.

Programming the POLYMATIC

General Remarks

In system shipments, the programming has already been carried out at the factory.

In subsystems, the expansions to be connected during start-up must be programmed appropriately.

NOTICE	**File the test certificate"Fluoro and DFR/DR Systems", RXD0-000.037.01... in Register 9 of the System or the Generator Binder.**

A help function is available in the Service Software beginning with Service Software **VE00A.**

- By clicking on the **"HELP"** box in the particular window or
- by pressing the "F1" function key on the PC or
- in the "Help" / "Index" in the main menu

valuable information and the required programming and entries can be selected.

Programming

1 Establishing the Generator - Service PC Connection

2 "System" / "Connect"

3 "Configuration" / "Options..." / "Page 2..."

- Set the dose and dose rate units of measurement.

4 "Configuration" / "Unit Selection" / "Button 1..."

Fluoroscopy Programming

The Test Certificate "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

- Select "Fluoroscopy" (if not already selected!)
- Select "FC-Details..."
- Appropriately program the "Primary FC-Data" and confirm with "OK".
- Appropriately program the "VIDEOMATIC P" and confirm with "OK".

- Record the values programmed in the Test Certificate:

  SID (focus-I.I. distance) in Chapters 4 and 4.2,
  Over-table units: 115 cm
  Under-table units: max. SID (do not move out the Distator)
  C-Arm units: 100 cm

  I.I. formats in Chapter 4.1.2

  Zoom dose rate (Zoom dose factors) in Chapters 4.1.2 and 4.2

  Dose rate in Chapters 4.1 and 4.2

  The fluoroscopy curves used by the customer in Chapter 4.2.

Additional Information:

- "maximum fluoro rate":
  - Therapy Simulation: OPTILIX 150/12/50 C: max. 1000 W
  - High Contrast Fluoro: MEGALIX 125/40/82 C: max. 1200 W
    (with HV generators beginning with Ser. No. 01056 max. 2000 W)
    with the fluoro footswitch with the 2nd pressure point
  - "Normal Fluoro" all other X-ray tubes max. 450 W
- When the image intensifier model is selected, all input boxes are assigned default values (see also the IQ reference value list).
- The dose rate selected is always relative to the full format (largest I.I. format!)!
- Program the same dose rate values for Automatic 1 and 2
- Fluoroscopy blocking: "Block on"
  according to regulations in Germany and in DHHS countries, fluoroscopy must be blocked after 5 minutes.
- If fluoroscopy is configured after the "test shots" of the X-ray tube, the X-ray tube test shots must be carried out again
  ("Adjustment"/"Tube 1..."/"PT Emulation...": Module J05, J06 and J07")!

Excerpt from the "Reference Value List for Fluoro and DFR/DR Systems":

Fluoroscopy dose rate at the I.I. input

2.1 mm Cu filter, X-ray tube voltage 65 - 85 kV

BV-Typ / I.I. Type	Formate / Formats	1, 2 Dosisleistg. Dose rate (nGy/s)	3 Hochkontrast / High contrast (nGy/s)	Zoom Dose Factors PL SX 50/80
40 cm HD	40 28 20 14	87 160 315 (435)	139 255 505 (695)	1: 2.0: 4.0: 5.0
40 cm HDR	40 30 22 17	87 120 255 440	139 195 405 700	1: 1.8: 3.3: 5.5
33 cm HD	33 23 17	113 240 450		1: 2.1: 3.8
33 cm HDR	33 22 17 13	113 235 405 680 (430)		1: 2.3: 3.8: 6.4 (3.8)
27 cm	27 17 14	174 445 655 (435)		1: 2.5: 3.7 (2.5)
Sirec.Komp. (alt/old)	22 17	261 435		1: 1.7
23 cm HDR/HDLE Sirec.Komp. (neu/new)	23 17 13	261 440 730 (470)		1: 1.8: 3.1 (1.8)

$U_{Multiplier}$ = 700 – 950 V ***1**

1 nGy/s = 0.115 µR/s / 1 µR/s = 8.7 nGy/s

Tolerance: I.I. full format ± 10%; at Zoom formats approximate value only.

Tolerance of indirect dose rate control ±1 kV, mA: ±10%

Values in brackets ( ) apply if TV iris diaphragm is configured.

Urology: With TV iris diaphragm for Automatic 2, set double the dose rate.

*1 effective beginning 7.93 (possible only with masked Multiplier)

DR Programming (if Configured)

The Test Certificate for "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

Select "DR" (if not already selected!)

- Select "DR-Details".
- Appropriately program the DR settings and confirm with "OK".
- Record the values programmed in the Test Certificate, Chapter 8.

Excerpt from the Reference Value List for "Fluoro and DFR/DR Systems":

BV-/ I.I. Format (cm)	Dose 50 (nGy/F)	Dose 100 (nGy/F)	Dose 200 (nGy/F)	Dose 500 (nGy/F)	Zoom-Dose Factors PL SX 50/80
40 HD 28 20 14	215 400 790 1090	435 800 1580 2175	870 1600 3160 4350	2175 4000 7900 10900	0.5: 1.0: 2.0: 2.5
40 HDR 30 22 17	215 305 635 1095	435 610 1270 2190	870 1220 2540 4385	2175 3045 6350 10960	0.5: 0.8: 1.5: 2.5
33 HD 23 17	305 650 1220	610 1305 2440	1220 2610 4880	3040 6525 12200	0.7: 1.4: 2.5
33 HDR 22 17 13	305 635 1095 1095	610 1270 2190 2190	1220 2540 4385 4385	3050 6350 10960 10960	0.7: 1.5: 2.5: 2.5
27 17 14	435 1110 1110	870 2220 2220	1740 4440 4440	4350 11100 11100	1.0: 2.5: 2.5
23 HDR 17 13	610 1020 1020	1220 2045 2045	2440 4090 4090	6100 10225 10225	1.4: 2.5: 2.5

$U_{Multiplier} \geq 450$ V***1**

1 nGy = 0,115 µR / 1 µR = 8,7 nGy

*1effectiv beginning 07.93 (possible only with masked Multiplier)

Tolerance ± 15% (DSA-Dose 500 + 15% / -20%)
At indirect dose measurement:Tolerance ±15% of the mAs value.
Tolerance for reproducibility at DSA (8/F/s; Dose 500): $\Delta \leq 20\%$ of Average

SIRCAM Programming (if Configured)

The Test Certificate for "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

Select "SIRCAM" (if not already selected!)

Select "Sirc-Details".

- Program the SIRCAM settings appropriately and confirm with "OK".
- Record the values programmed in the Test Certificate:
  - Zoom dose rate (Zoom Dose Factor) in Chapter 7.1.1.2
  - Dose (SIRCAM dose) in Chapter 7.1.1

Excerpt from the Reference Value List for "Fluoro and DFR/DR Systems:

BV-Type I.I. Type	Formate formats	Dosis Dose (nGy)	POLYDOROS SX 50/80 Zoom Dose Factors
40 cm HD	40 28 20 14	218 400 790 1600 (1090)	1 2 4 8.2 (5)
33 cm HD	33 23 17	261 560 1050	1 2.1 3.8
33 cm HDR	33 22 17 13	261 545 1010 1565 (990)	1 2.3 3.8 6.4 (3.8)
27 cm	27 17 14	435 1110 1635 (1090)	1 2.5 3.7 (2.5)
23 cm HDR	23 17 13	574 965 1610 (1030)	1: 1.8: 3.1 (1.8)

$U_{Multiplier} \geq 450$ V***1**	1 nGy = 0.115 µR / 1 µR = 8.7 nGy

Tolerance: ± 15%, at Zoom formats approximate value only.

At indirect dose measurement: Tolerance ±15% of the mAs value.

Values in brackets ( ) apply if I.I exposure diaphragm is configured.

*1 effective beginning 07.93 (possible only with masked Multiplier)

Configuration" / "IONTOMAT..."

The detector allocation must be carried out for the "Indirect Ionto channel":

- Choose "FC-Channel" (set in "Configuration" / "Unitselection" / "Button 1..." "FC-Details...")
- Select "CHANNEL Prog."
- Choose "Detector"
  possible detectors: **Multiplier** or **B-Signal** or **PDA** (Photo Diode Array)

  Remark for PDA:
  "Invert MF": not selected with SIREGRAPH CF
  selected with POLYSTAR

"Data" / "Restore"

After completing programming, download the system configuration from the PC to the generator.

IMPORTANT **Changes made in the "Configuration" main menu are effective only after a "Data" / "Restore" in the generator.**

IONTOMAT P: Checking Drift and Hum (Ripple) during Fluoroscopy

- Switch SS **OFF.**
- Connect the oscilloscope to D901.X2.7 and D901.X2.1 (0 V)
  Trigger: D211.SWR
- Select the fluoro unit at the control deck.

a) Checking the Drift (without radiation)

- Switch on fluoroscopy at the unit and measure drift for 1 minute.
  Max. admissible drift: ≤ ±20 mV/min.
- Switch off fluoroscopy.

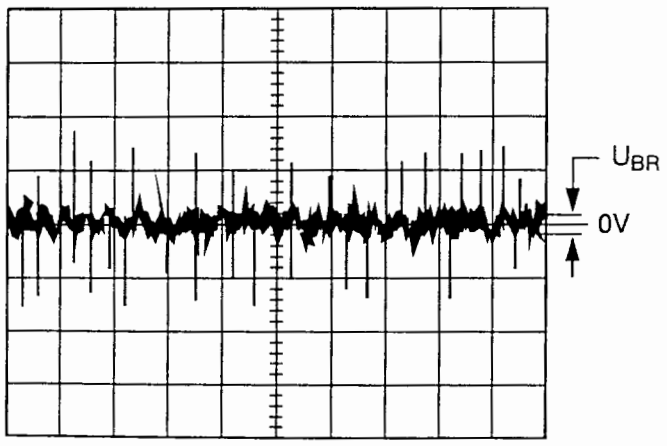
b) Checking the Hum (Ripple) (without radiation)

- Switch on fluoroscopy at the unit and measure the hum (ripple).
  Max. admissible hum: ≤ 20 mV_{SS} (per oscillogram 2).
- Switch off fluoroscopy.

After completing the measurements:

- Disconnect the oscilloscope test leads.
- Switch SS **ON**

Enter the measurement results in the "Test Certificate for Direct Exposure Units" RXD0-000.037.05... Chapter 4 (in Register 9 of the System or Generator Binder).



Oscillogram 2:

Noise at D901.X2.7

(Example)

10 mV/T

10 ms/T

Adjusting the Dose Rate

General Remarks

Three types of dose rate control are possible with the POLYDOROS SX 50/80.
The following detectors can be connected:

a) Multiplier (Photo-)
b) PDA (Photo Diode Array)
c) B-Signal (SIRECON Kompakt, Videomed DI-K)

NOTICE

The Test Certificate for "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

a) Adjusting the Dose Rate with the Multiplier

Preparations (Test Setup)

- Select I.I. full format.
- Set the SID
  Over-table units: 115 cm
  Under-table units: max. SID (Distator not moved out)
  C-Arm units: 100 cm

- Insert **1.2 mm copper** in the collimator
- Place the dose measurement chamber so that it is centered on the I.I.
- Collimate to the size of the dose measurement chamber.

Adjustment

- At the Service PC, after **"System" / "Connect"**
  select **"Adjustment" / "Doserate"**
- Record the amount of copper inserted into the collimator in the appropriate input window "CU: [mm]" (only a display! - no function).

- Carry out **Adjustment of the Dose Rate: 174 nGy/s (20 µR/s)** using the prompted routine in the Service Software.
- After the display "EEPROM Status ok" appears, the values in the field: "Status" are stored in the generator.

- Record the values that result in the Test Certificate:
  - MPL Area 1 in Chapter 4 and for
  - MPL Area 2 in Chapter 8.1
- Use "Leave Module" to exit the adjusmtent module "Dose rate".

At the Service PC: select "System" / "Disconnect".

NOTICE

The actions to be made are displayed in the field: "User action".

Commands are sent to the generator using the switch box located just below this, e.g.: starting the adjustment with the switch box: "Start Measuring".
The values of the current or of the last adjustment are displayed n the field marked "Data.
Always switch fluoroscopy ON/OFF from the D211 board.
Use the "←" and "→" keys to change the tube current until 174 nGy/s (20 µR/s) is measured - take note of the unit attenuation factor (see Chapter 2). The next adjustment is started using this tube current.
Carry out adjustment of the dose rate 174 nGy/s (20 µR/s) as accurately as possible because all dose and dose rate values are derived from this adjustment.
With the automatic adjustments for multiplier ranges "1" (20 µR/s) and "2" (250 µR/s), an adjustment must be achieved, i.e., the multiplier voltages adjusted are displayed in the "Data" field (admissible deviation: +/- 1).

b) Adjusting the Dose Rate with the PDA/SDM

Additional information about the **PDA** (Photo Diode Array) and **SDM** (Selective Dominant Measurement) can be found in the Appendix.

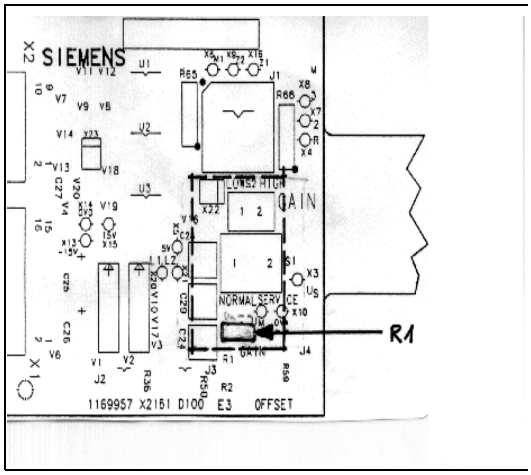
Preparations (Test Setup)

- Connect the DVM to **D901 X2.1** (0V) and **X2.7** (Signal):
  Nominal value: 0V +/-10 mV in the Standby mode (Fluoro **OFF**)
  If the display is > 10 mV, it is possible that too much external light is reaching the PDA.
  Corrective measure: install the cover panels on the light distributor.
- Select the I.I. full format and Automatic 1.
- Select the middle, rectangular measuring field.
- Set the SID:
  OT units = 115 cm
  UT units = max. distance
  Polystar = 100 cm
- **Insert 1.2 mm Cu in the collimator**
- Position the dose measurement chamber so that it is centered on the I.I.
- Collimate to the size of the dose measuring chamber.

Preadjustment - "PDA Preadjust"

- At the Service PC after **"System" / "Connect",**
  select **"Adjustment" / "Doserate"**
- Record the amount of copper inserted into the collimator in the appropriate entry box "Cu: [mm]" (display only ! - no function).
- Carry out the adjustment of dose rate using the prompted routine from the service software.
- Click on the switch box "Start Measuring".
- Use the S1 on the D211 board to start fluoroscopy.
- Set **870 nGy/s (100 µR/S)** at the I.I. input by increasing the tube current*
  This tube current is used to start the next adjustment.
- ***Caution:** take note of the unit attenuation factor
  Polystar: 1.8 --> 1566 nGy/s (180 µR/s)
  Siregraph CF: 1.0 --> 870 nGy/s (100 µR/s)
- Click on the switch box "Stop DR".
- Switch fluoro **OFF** and remove the dose measuring chamber.
- Open the collimator all the way.
- Connect the DVM to D901.X2.1 and X2.7.
- "Start FS" (switch fluoro on) with D211, S1
- **Use R1 on D100 in the camera adapter to set 700 mV +/- 35 mV**
  if needed, switch to the amplification (factor: 4) usign the S2 on the D100. When this is done, the S1 fluoroscopy switch on the D21can be switched on and off as often as wished.
- Install the housing over the light distributor.
- Recheck the 700 mV setting.
- "Please STOP FC"
- Stop Preadjust
- Deselect "PDA Preadjust".

D100 Camera Adapter



Carrying Out the Sensitivity Adjustment

- Open the collimator all the way.
- Select I.I. full format.

- "Please Start FC":Fluoro **ON** with S1/D211 (in the generator).
  The adjustment is carried out automatically for all I.I. formats and measuring field combinations (9). Fluoroscopy will be interrupted automatically for approx. 1 second between the individual adjustments.
- "Please Stop FC":Fluoro **OFF**, S1/D211.
- Select the next Zoom step.
- Carry out the adjustment for each Zoom step.
- The values will be stored in the generator following the display "EEPROM Status ok" in the field: "Status".
- The "Doserate" adjustment module is exited by selecting "Leave Module".
- At the Service PC: select "System" / "Disconnect".

NOTICE

In the field: "User action" (actions carried out by the user) the steps that must be carried out are displayed.

Commands are sent to the generator by clicking on the switch box located just below this field, e.g.: starting the adjustment by clicking on the switch box: "Start Measuring"

Always switch fluoroscopy ON/OFF from the D211 board.

Use the "←" and "→" keys to change the tube current until 870 nGy/s (100 μR/s) is measured.
Take note of the unit attenuation factor (see Chapter 2).
Carry out the dose adjustment of 870 nGy/s (100 μR/s) as accurately as possible because all dose and dose rate values are derived from this value.

Automatic adjustment will be carried out for all I.I. formats and for all possible measuring field combinations. The values of the current or of the last adjustment are displayed in the field: "Data" / "PDA Data".
The maximum "+" and "-" difference is around +/- 8.
The absolute difference - in the full format - between the left center and right measuring field is about +/- 16.

c) Adjusting the Dose Rate Using the B-Signal

Preparations (Test Setup)

- Select the I.I. full format.
- Set the SID:
  Over-table units: 115 cm
  Under-table units: max. SID (do not move out the Distator)
  C-Arm units: 100 cm
- Insert **1.2 mm copper** in the collimator.
- Position the dose measuring chamber so that it is centered on the I.I.
- Collimate to the size of the dose measuring chamber.

Adjustment

- At the Service PC, following **"System" / "Connect"**
  select **"Adjustment" / "Doserate"**
- Record the amount of copper inserted into the collimator in the appropriate input box "Cu: [mm]" (display only! - no function).
- Adjust the **Dose rate to 260 nGy/s (30 µR/s)** using the prompted routine in the service software.
- The values are stored in the generator after the message "EEPROM Status ok" is displayed in the field: "Status".
- Exit the "Doserate" adjustment module by clicking on "Leave Module".
- At the Service PC: select "System" / "Disconnect".

NOTICES

The steps to be carried out are displayed in the field: "User action" (actions performed by the user).

Commands are sent to the generator by clicking on the switch box directly below this field, e.g.:Starting the adjustment with the switch box: "Start Measuring"

The values of the current or of the last adjustment are displayed in the field: "Data".

Fluoroscopy is switched on and off twice during the adjustment. Please make sure to maintain the following sequence:
Step 1: Switch Fluoro ON at the unit (enables the TV channel)
Step 2: Switch Fluoro ON at board D211(enables radiation)
Step 3: Switch Fluoro OFF at board D211
Step 4: Switch Fluoro OFF at the unit

Use the "←" and "→" keys to change the tube current until 260 nGy/s (30 µR/s) is measured.

Take the unit attenuation factor into accound (see chapter 2). Perform adjustment for the dose rate as accurately as possible.

Checking the Dose Rate for Fluoroscopy

Preparations (Test Setup)

- For Automatic 1, temporarily program the C00 fluoro curve ("Configuration" / "Unit selection" / "Button 1..." / "FC-Details..."/"Videomatic P" then "Data" / "Restore")
- Insert the 2.1 mm Precision copper filter in the collimator (with under-table units, place it on the tabletop)
- Set the SID:
  Over-table units: 115 cm
  Under-table units: max. SID (do not move out the Distator)
  C-Arm units: 100 cm
- Select Automatic 1 and I.I. full format.
- Move in the grid.
- With the 40 cm I.I.:
  with the multiplier: select the round ADC measuring field in the middle;
  with the PDA/SDM: select the rectangular measuring field.

- Position the dose measuring chamber so that it is centered on the I.I. and collimate to the size of the dose measuring chamber.

NOTICE

If it is not possible to measure directly at the I.I. input, measure on the tabletop or at the back wall of the spotfilm device or on the grid and use the unit attenuation factor (m) to calculate for the I.I. input.
The cassette loading slot on the spotfilm device applies as the I.I. input (see also Chapter 2).

With TV systems in which the ADC measuring field is larger than the dose measurement chamber, a switch to automatic STOP must take place after fluoroscopy has stabilized and then move the dose measuring chamber into the beam path. In this case, the factor 0.94 for radiation attenuation of the dose measuring chamber does not need to be taken into consideration.

First enter the measured dose rates ($\dot{K}_{Bg}$ or $\dot{K}_{Tg}$) into the Test Certificate and then the calculate the corrected value K_B and enter it.

With the 12 cm and 14 cm I.I. format (if not measured directly at the I.I. input) the dose measuring chamber is not fully exposed. Thus, the measured dose rate values are lower than the actual values.
Record this fact under remarks in the Test Certificate, Chapter 4.1.2.

Check

The Test Certificate "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the Generator Binder.

- Switch on fluoroscopy at the unit.
- Measure the dose rate values for all I.I. formats ($\dot{K}_{Bg}$ or $\dot{K}_{Tg}$) and enter the values in the Test Certificate, Chapter 4.1.2.
  Admissible deviation with I.I. full format: +/- 10%; relative to the dose rate programmed under "Configuration" / "Unit selection" / "FC-Details" / "Vidomatic P" ! (for Zoom formats, these are only reference values!)
- Remove the dose measuring chamber from the beam path.
- Open the collimator all the way.
- Record the kV and mA values which adjust under fluoroscopy (display on control console) for all I.I. formats i n the Test Certificate, Chapter 4.1.2.
  Admissible tolerance for indirect dose check: +/- 1 kV; mA: +/- 10 %

Checking the Dose/Image for SIRCAM

- Connect the mAs meter.
- For the test setup, see "Checking the Dose Rate".
- Select SIRCAM .
- Call up (or generate) zero-point technique organ program
  - small focus
  - 1 f/s or single frame
  - 70 kV plateau (C14, selectable with the ms buttons)

- Measure and record in the Test Certificate, Chapter 7.1.1.2 (K_{Bg} or K_{Tg}). If the pointer of the dose measuring device does not deflect enough, make several exposures and divide the measured dose value by the number of exposures.
- Calculate and record the dose at the I.I. input:

  $K_B = K_{Bg}$ x 0.94; $K_B = \frac{K_{Tg} \times 0.94}{m}$

  Factor 0.94 = 6% radiation attenuation caused by dose measuring chamber.

- Remove the dose measuring chamber from the beam path and record the indicated kV values and resulting mAs values and the resulting mAs values for each single exposure for all I.I. formats in the Test Certificate (Chapter 7.1.1.2).

Note

With 12 cm I.I. format and 14 cm I.I. format (if measurement is not performed directly at the I.I. input), the dose measuring chamber is not exposed completely. As a result, the measured dose rate values are lower than the actual values. Indicate this fact under "remarks" in the Test Certificate.

Setting the Maximum Skin Dose Rate

In accordance with the country-specific regulations, set the maximum admissible values.
In DHHS countries, set for

- "Hand kV": 4.5 R/min (660 nGy/s)
- "Normal Fluoroscopy 9.0 R/min (13200 nGy/s)
- "High Contrast Fluoroscopy": 18.0 R/min (2620 nGy/s)

If **no** such regulations exist, carry out the module with "SS" switched OFF. For 110 kV and 70 kV, set **18 mA** for each.

Preparations (Test Setup)

- Select the I.I. full format.
- Set the minimum SID:
  - Over-table units: 115 cm
  - Under-table units: min. SID (do not move out the Distator)
  - C-Arm units: min. SID (POLYSTAR. 86.6 cm)
- Insert 1.2 mm copper into the collimator.
- Position the dose measuring chamber, with
  - Over-table units at a distance of 30 cm above the tabletop
  - Under-table units on the tabletop
  - C-Arm units at a distance of 30 cm above the I.I.

  This distance must be maintained - regardless of the SID.

- Collimate to the size of the dose measuring chamber.
- Remove the fuses in the I.I. power supply (risk of burn-in).

Adjustment

At the Service PC, after **"System" / "Connect "**
select **"Adjustment" / "Skindoserate"**

NOTICE

If reduced skin dose rate (5 R/Min.; 733 µGy/s) must be used for kV Hand and/or Automatic/HC, mark the appropriate field prior to the adjustment:

- Carry out the adjustment of maximum skin dose rate (SDR) by following the prompted routine in the service software.

NOTICES

The steps to be carried out are displayed in the field: "User action" (actions performed by the user).

Commands are sent to the generator in the switch box directly under this field, e.g.: Starting the adjustment with the switch box: "Start Measuring"

The values of the current or the last adjustment are displayed in the field: "Data".

Use the "←" and "→" keys to change the tube current until the maximum skin dose rate of 9 R/min (1320 µGy/s) is measured. If there are no regulations to limit the maximum skin dose rate, set 18 mA.

The values are stored in the generator after the message "EEPROM Status ok" is displayed in the field: "Status".

Exit the "Skindoserate" adjustment module with "Leave Module".

At the Service-PC: select "System" / "Disconnect".

Final Check of the Skin Dose Rate

The Test Certificate "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System- or Generator binder.

- Retain the distance between the dose measuring chamber and the I.I.
- Change the SID and check the dose rate.
- At no SID may the dose rate of 9 R/min be exceeded.
- Select I.I. full format.
- Set the minimum SID.
- Select all Automatic steps (if configured, also using the second pressure point).

- Record the values that result forr
  - dose rate and
  - the kV and mA values (display on the control console)

  in the Test Certificate, Chapter 4.4.2.
- Reinstall the fuses in the I.I. power supply.

Calibrating the Acquisition (Poly-I.I. Adaption)

Preparations (Test Conditions)

- Insert the 20 cm water phantom - maintain exactly - into the beam path.
- Set the SID:
  - Over-table units: 115 cm
  - Under-table units: max. SID (do not move out the Distator)
  - C-Arm units: 100 cm
- Select the I.I. full format.
- Move in the grid.
- With the 40 cm I.I.:
  with multiplier: select the round, middle ADC measuring field
  with PDA/SDM: select the rectangular measuring field in the middle
- Assign any organ field with the C00 acquisition curve (Fluorospot H: C29) and select it.

NOTICE

Curve C00/C29 is intended exclusively for calibration and should not be used for the "normal" exposure mode.

- Collimate to the size of the water phantom.

Check

- Switch on fluoroscopy (from the unit).

70 kV must adjust as the exposure voltage; admissible tolerance: +/- 1 kV.

- With deviations from this tolerance: select "Adjustment" / "Poly-I.I. Adaptation" do **not** carry out "System" / "Connect" (generator is **not** in the service mode).
- Carry out the adjustment by following the prompted routine in the service software.
- The values are stored in the generator after the message "EEPROM Status ok" is displayed in the field: "Status".
- Exit the "Poly-I.I. Adaption" adjustment module with "Leave Module".
- At the Service PC: select "System" / "Disconnect".
- Repeat the check.

NOTICE

The adjustment can be carried out manually or automatically (by marking the appropriate box).

Alternately, the deviation can be appropriately corrected in the window "Primary FC-Data":
Select "System" / "Connect"
Select "Configuration" / "Unit selection" / "Button 1..." / "FC-Details..." / "Videomatic P"/ "Primary FC-Data": correct Poly-I.I. Adaption.
Select "Data" / "Restore".
Select "System" / "Disconnect".

Adjusting the TV Iris Diaphragm

NOTICE

For technical reasons, the "TV Iris diaphragm Adjustment Module" must also be programmed even without the built-in TV iris diaphragm. However programming is carried out without high voltage! Switch SS "OFF" on the D200.

Basic adjustment of the "Analog Iris Control" (only if the iris is configured) D270/D270A Part No. 37 74 697 X2084

a) Adjustment to the "maximum diaphragm opening" with an open control circuit (basic diaphragm adjustment)

- Remove jumper B (1 - 2).
- Use potentiometer R7 to open the diaphragm until LED V13 lights up (maximum opening).
- Turn R7 in the opposite direction until LED V13 just goes out.
- Reinstall the jumper B (1 - 2).
- Select "System" / "Connect" and confirm with "ok".
- Select "Diagnostics" / "Tests" / "General...".

b) Adjusting the "minimum diaphragm opening" with a closed control circuit (Basic diaphragm adjustment)

- Select "T92" "Close Iris" and click on "Run".
- Use potentiometer R27 to close the diaphragm until LED V14lights up (minimum opening).
- Turn R27 in the opposite direction until LED V14 just goes out.

c) Adjusting to the "maximum diaphragm opening" with a closed control circuit (Basic diaphragm adjustment)

- Select "T91" "Open Iris" and click on "Run".
- Use potentiometer R31 to open the diaphragm until LED V13 lights up (maximum opening).
- Turn potentiometer R31 in the opposite direction until LED V13 just goes out.
- Exit the test module.

Adjusting the TV Iris Diaphragm

Preparations (Test Setup)

- Insert 1.2 mm copper in the collimator.
- Set the SID:
  - Over-table units: 115 cm
  - Under-table units: max. FFA (do not move out the Distator)
  - C-Arm units: 100 cm
- Select I.I. full format.
- Move in the grid.
- Open the collimator all the way.

Ausnahmen:

VIDEOMED HD:

- Oszilloskop an TP BAK (VZ-Platine), Trigger an Ext.A auf AZ-Platine (bei SUPERVISION Trigger an BAS+)

VIDEOMED K / Sirecon Kompakt:

- Oszilloskop an Meßpunkt M95 / D15 C1 (+) gegen TP F

VIDEOMED DI/DIM/DIK:

- Oszilloskop an Meßpunkt D1, X401

VIDEOMED SX:

- Oszilloskop an TP 8 auf Platine D8 in

- Eine Zeile in Bildmitte (Rauschmitte) mit Zeilenfischer(größere Meßgenauigkeit) triggern

Television CCU	Camera tube	Bias light or black current portion	**B-Signal** without bias light or black current portion
Videomed H1X	Saticon	No DFR: 20, +/- 5 mV With DFR: 40, +/- 5 mV	110 mV; +10 / -20 mV*
Videomed HD	DG-Saticon	30 +/- 5 mV	130 mV, +10 / -20 mV*
Videomed H1	Saticon	20 +/- 5 mV	110 mV; +10 / -20 mV
Videomed H1, N1	Hivicon	≤ 100 mV	180 mV, +/ -15 mV
Videomed N1	DG-Saticon	20 +/ -5 mV	110 mV; +10 / -20 mV
Videomed K, Sirecon Kompakt	Hivicon	n.a.	27 ... 38 mV
Videomed DI/DIM/DIK	CCD-Chip	n.a.	155 mV; +/- 20 mV Urology: 300 mV; +/- 40 mV
Videomed SX, H1X Emulation	Saticon	60 +/- 10 mV	80 mV; + 10 / - 20 mV*
Videomed SX, HD Emulation	Saticon	70 +/- 15 mV	180 mV, + 15 / - 20 mV**
Videomed H, N	Plumbicon	n.a.	165 mV, +/- 15 mV

With high contrast fluoroscopy, Supervision: *+/- 20 mV//**+25mV/-20 mV

- Switch SS **OFF**; SS key on the D200 is out.
- Switch on fluoroscopy at the unit.
- Check the bias light and if needed, readjust it.
- Switch SS ON.

Adjustment

- At the Service-PC, select **"Adjustment" / "TV Iris diaphragm"**.
- Mark "Mirror Correction".
- Carry out the adjustment using the prompted routine in the service software **"without" and "with" mirror**
- The values are stored in the generator after the message "EEPROM Status ok" appears in the field: "Status".
- Exit the "TV IRIS diaphragm adjustment module with **"Leave Module"**.
- At the Service PC: select **"System" / "Disconnect**" .

Checking the B-Signal Values

The Test Certificate "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

Preparations (Test Setup)

- Insert the 2.1 mm Precision copper filter in the collimator.
- Set the SID:
  - Over-table units: 115 cm
  - Under-table units: max. SID (do not move out the Distator)
  - C-Arm units: 100 cm
- Select I.I. full format.
- Move in the grid.
- Open the collimator all the way.
- Select the C00 fluoroscopy curve
- Connect the multimeter: POLYDOROS SX, D271:X6.14 (U_{IRIS_IST}) and X5 (0V)
- Connect the oscilloscope to test point 8 and 0V (ground); on the VV board i n the TV CCU, use an expanded time base (higher measuring accuracy) to measure one line in the middle of the image (middle of noise).
- Switch on fluoroscopy and for all I.I. formats, measure
  - the B-Signal (without the bias light and black current portions) and
  - the iris voltage value U_{IRIS_IST} and
    record the results in the Test Certificate, 5.3.2.

NOTICE

The anticipated iris adjustment is calculated for DR exposures. Beginning with a particular opening (> 60 mm; for SDM > 50 mm) the mirror automatically moves out and thus the iris opening is smaller.

The adjustment must be carried out with and without the mirror, otherwise fluoroscopy will not be enabled.

The adjustment with the mirror must be carried out even if no mirror is configured

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Programming the Fluoro Curves

The Test Certificate "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

Generally, two fluoroscopy curves are used for operation.

Depending on the unit, selection of additional curves is possible in RAS version systems, e.g. POLYSTAR with Automatic keys.
If a footswitch with two pressure points is connected, high contrast fluoroscopy with its own curve is possible at the 2nd pressure point.

- Discuss the curves with the customer and then program them and record them (in the Test Certificate, Chapter 4.2, as well as in the Operating Instructions).
- Programming is carried out under "Configuration" / "Unit selection" and "FC-Details".
- For Automatic 1 - 4, if configured, program the fluoro curves.

a) Normal Fluoroscopy

Recommended:

Program the following two curves as defaults:
- Automatic 1: C10, 110 kV - "Dose-saving"
- Automatic 2: C03, 70 kV - "High-contrast"

Dose rate is the same for Automatic 1 and Automatic 2 (Autom. 3 - 4)

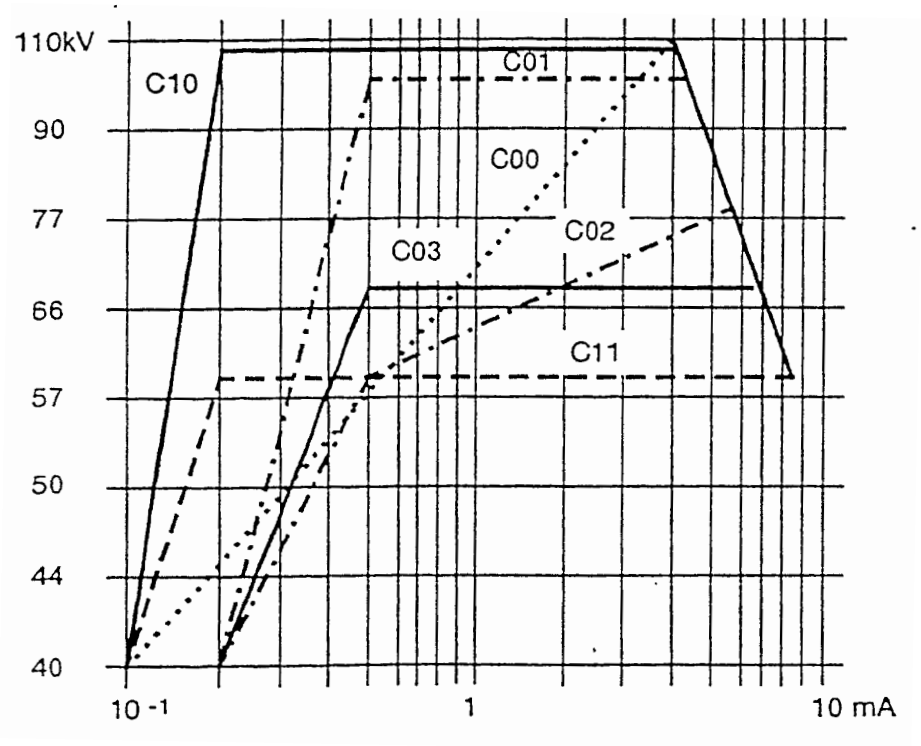


Fig. 1

Using the Curves:

C01, C10:	Curves with low radiation exposure; also particularly well suited for pediatrics.
C02, C03, C11:	Curves with especially high contrast
C00:	Antiisowatt curve

b) High Contrast Fluoroscopy

Prerequisite for this operating mode is a MEGALIX X-ray tube housing assembly with circulation cooling.
Selection is made with the 2nd pressure point of a two-step footswitch

Selection of this mode of operation is displayed acoustically, with ☒ HC-gong

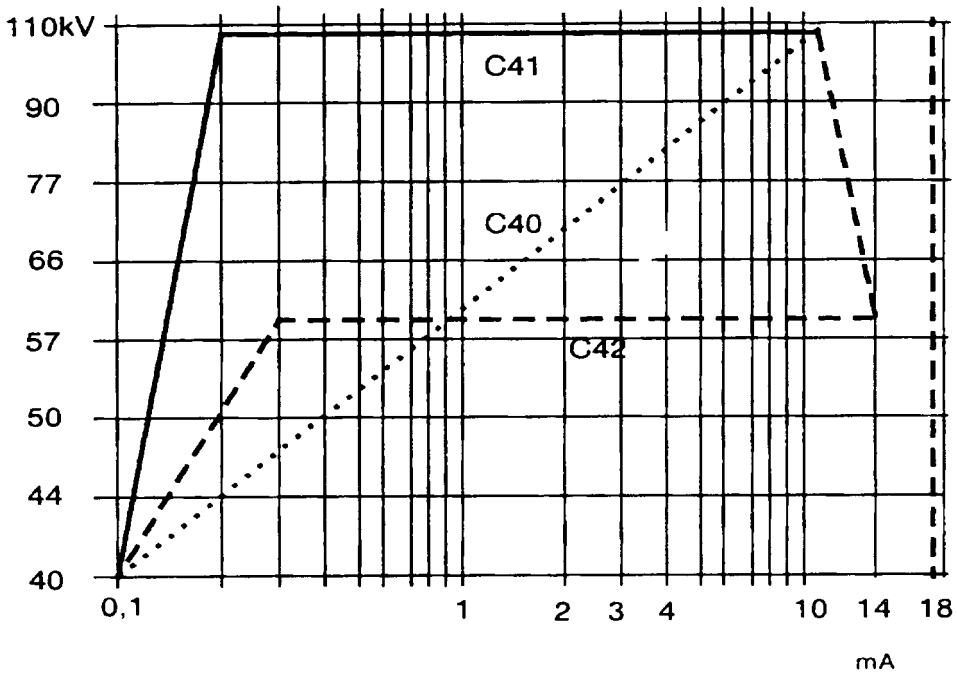


Fig. 2

The curves shown in Fig. 2 are stored under the Numbers C40...C79.

Use of the Curves

C40: Antiisowatt curve
C41: Curve with low radiation exposure
C42: Curve with especially high contrast

Additional curves are stored as follows, but are not plotted for the sake of brevity.

C50: 40 kV / 0.1 mA, 55 kV / 0.4 mA, 85 kV / 14 mA, 110 kV / 9 mA
C60: 40 kV / 0.1 mA, 55 kV / 0.4 mA, 85 kV / 18 mA, 110 kV / 18 mA
C61: 40 kV / 0.1 mA, 110 kV / 18 mA
C62: 40 kV / 0.1 mA, 50 kV / 0.4 mA, 90 kV / 18 mA, 110 kV / 18 mA
C63: 40 kV / 0.1 mA, 50 kV / 0.4 mA, 80 kV / 18 mA, 110 kV / 18 mA
C64: 40 kV / 0.1 mA, 60 kV / 0.2 mA, 60 kV / 18 mA, 110 kV / 18 mA
C65: 40 kV / 0.1 mA, 110 kV / 0.2 mA, 110 kV / 18 mA

Dose rate is the same for Automatic 1 and Automatic 2 (Automatic 3).

c) Therapy Simulation

- The OPTILIX 150/12/50C X-ray tube is used for the Therapy Simulation mode (16 degree anode angle).
  1000 W may be programmed as the max. fluoro power for this X-ray tube.

  The same curves used as fluoro curves as for high contrast fluoroscopy.

Generating Your Own Fluoro Curves (Brief Description)

NOTICE **Curves C80...C99 are freely programmable for normal fluoro, for high contrast fluoro and for therapy simulation.**

- Select "System" / "Connect".
- Choose "Configuration" / "FC Curves..."
- Select "Data" / "Load" or "Backup..."
- Select fluoro curves: C80...C99 and edit them accordingly and conclude with "OK".
- Copy the data to the generator with "Data" / "Restore...".
- Allocate the fluoroscopy curves to the Automatic steps as appropriate (in "Configuration" / "Unit selection" / "Button 1" / "FC-Details" / "Videomatic P")
- Select "Data" / "Restore"
- Select "System" / "Disconnect"

NOTICE **The fluoro curves can be printed out over "Data" / "Print".**

Final Recording of Fluoroscopy

The Test Certificate for "Fluoro and DFR/DR Systems", RXD0-000.037.01... is filed in Register 9 of the System or Generator Binder.

Record the fluoroscopy parameters (dose rate values, fluoroscopy curves and the zoom dose rate factors/zoom dose rate) made at the customer's location for all Automatic steps in the Test Certificate, Chapter 4.2
(from: "Configuration" / "Unit selection" / "Button 1..." / "FC-Details..." / "Videomatic P").

Preparations (Test Setup)

- Insert the 2.1 mm Precision copper filter in the collimator.
- Set the SID
  - Over-table units: 115 cm
  - Under-table units: max. SID (Distator not moved out)
  - C-Arm units: 100 cm
- Select the I.I. full format.
- Move in the grid.
- Completely open the collimator.

Recording

- **Switch on fluoro on the unit side.**
- **Record the kV and mA values that are adjusted for all automatic steps and I.I. formats in the Test Certificate, Chapter 4.2 (display on the generator console).**

NOTICE	**The values entered in Table 4.2 of the Test Certificate can be used for the check of the indirect dose rate in later service calls.**

Exposure curves

General Remarks

The object thickness is determined during fluoroscopy in the Polymatic. The exposure parameters are determined on the basis of this value for direct and indirect technique:

Direct technique:

- Exposure-kV
- Density correctionr

Indirect technique:

- Exposure kV
- Focus
- Exposure current
- Density correction
- Exposure time

Memory locations for 99 curves are available.
These memory locations are divided as follows:

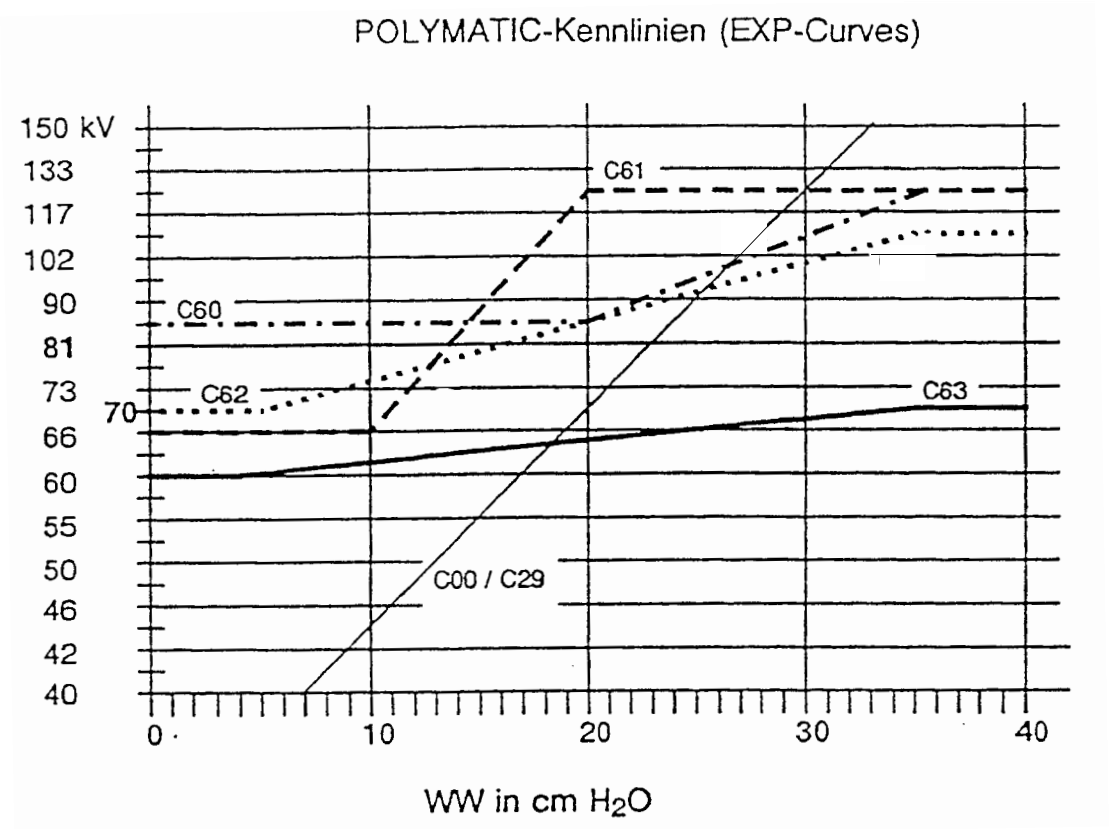
- Curves C01...C79 are stored in the firmware.
  - **Curve C00/C29 is a check curve for checking the transfer**.
    These characteristics must not be programmed for operation.
  - Under the numbers C01...C27, constant kV curves are stored in ascending order (see table) at kV point intervals of 40 kV to 150 kV. They include: small focus, auto focus, no density correction. As delta kV value, the difference to the next higher kV value +1 kV is entered.
    These curves are used for all indirect exposure techniques.
  - The numbers C31 to C57 include constant kV curves at kV-point intervals of 40.5 kV to 145 (see table).The other conditions correspond to curves C01..C27.

Characteristic curves

C01	. . . . .	40 kV	C31	. . . . .	40.5 kV
C02	. . . . .	41 kV	C32	. . . . .	41.5 kV
C03	. . . . .	42 kV	C33	. . . . .	43 kV
C04	. . . . .	44 kV	C34	. . . . .	45 kV
C05	. . . . .	46 kV	C35	. . . . .	47 kV
C06	. . . . .	48 kV	C36	. . . . .	49 kV
C07	. . . . .	50 kV	C37	. . . . .	51 kV
C08	. . . . .	52 kV	C38	. . . . .	53.5 kV
C09	. . . . .	55 kV	C39	. . . . .	56 kV
C10	. . . . .	57 kV	C40	. . . . .	58.5 kV
C11	. . . . .	60 kV	C41	. . . . .	61.5 kV
C12	. . . . .	63 kV	C42	. . . . .	64.5 kV
C13	. . . . .	66 kV	C43	. . . . .	68 kV
C14	. . . . .	70 kV	C44	. . . . .	71.5 kv
C15	. . . . .	73 kV	C45	. . . . .	75 kV
C16	. . . . .	77 kV	C46	. . . . .	79 kV
C17	. . . . .	81 kV	C47	. . . . .	83 kV
C18	. . . . .	85 kV	C48	. . . . .	87.5 kV
C19	. . . . .	90 kV	C49	. . . . .	93 kV
C20	. . . . .	96 kV	C50	. . . . .	99 kV
C21	. . . . .	102 kV	C51	. . . . .	105 kV
C22	. . . . .	109 kV	C52	. . . . .	113 kV
C23	. . . . .	117 kV	C53	. . . . .	121 kV
C24	. . . . .	125 kV	C54	. . . . .	129 kV
C25	. . . . .	133 kV	C55	. . . . .	137 kV
C26	. . . . .	141 kV	C56	. . . . .	145 kV
C27	. . . . .	150 kV			

- The following curves arerogrammed for various medical applications:

C60: Gastrointestinal tract I 85...125 kV
C61: Thorax 66...125 kV
C62: Gastrointestinal tract II 70...109 kV
C63: Gall bladder/kidney 60...70 kV



Generating Your Own Curves

- The numbers 80 to 99 are reserved for curves which can be programmed freely as requested by the customer.
  It is possible to use existing curves unchanged or to program separate curves. Generation of the customer-specific curves is described below. Select "System" / "Connect".
- Select "Configuration" / "EXP-Curves..."
- Select "Data" / "Load" or "Backup..."
- Select exposure curves: C80...C99 and edit them accordingly and exit with "OK".
- Copy the data to the generator with "Data" / "Restore...".
- Select "System" / "Disconnect"

NOTICE	**The exposure curves can be printed out over "Data" / "Print".**

Allocating the Exposure Curves to the Organ Keys

Use the following procedure to allocate the curves
(see also the POLYDOROS SX 50/80 Operating Instructions).

- Select the program menu and press the lock key.
- Select the exposure technique at the unit (direct technique or Sircam)
- Press the particular organ key.
- Switch "0-Point Technique" on.
- Select the desired acquisition curve in the report line using the +/- keys.
- If the focus or autofocus contained in the curve is not to be used, then select the desired focus (if both LEDs light up, Autofocus is selected).
- If needed, enter additional density correction with the key
- Save the configuration by pressing "SAVE".
- Use the lock key to switch off the programming unit.

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Options

- Select "Configuration"/"Options"
- Is the default organ program (and default exposure system) selected when generator is **"ON"**?
- Adjustment of the patient profile is reset when there is a change of the organ program.
- With the direct technique: 0-Point Technique can be switched on with the organ change and 0-Point key
  Can be switched on only with the 0-Point key
- With SIRCAM: 0-Point Technique can be switched on with organ change and 0-Point key
  Can be switched on only with the 0-Point key
- With the 0-Point Technique without fluoroscopy, no exposure data available (exposure blocking)! Take the exposure data from the average water value (nominal value) of the exposure curve.
- Enter the dose/dose rate value in µR/ µRs or in nGy/ nGy/s
- With "Data" / "Store" store the programm settings

NOTICE

Additional information about the options can always be obtained by selecting "Help" / "Index" under "The Service Software Menu" / "Configuration".

Important: Saving the Programming

After completing the start-up, it is extremely important to save the programming.

There must be "four" system-specific files in the directory on Diskette 3- of the generator service software (with software VE00A e.g.: "a:\pl_sx\ve00a\backup") or these files must be created.

- "kundexyz.**210**" - system configuration ("Configuration"), adjustments ("Adjustment") and organ program data;
  the save is made in the main menu
  "Data" / "Change Host..." / "Backup Data"

- "kundexyz.**alp**" - system configuration ("Configuration")
  the save is made in the main menu
  "Data" / "Backup";
  "Data" / "Save..."

- "kundexyz.**cpr**" - organ program names
  the save is made in the main menu
  "Configuration" / "Organ Programs" / "Backup names ..."

- "kundexyz.**opr**" - organ program data
  the save is made in the main menu
  "Configuration" / "Organ Programs" / "Backup data ..."

When doing this, observe the following:

- The file name "kundexyz" is composed of a maximum of 8 freely selectable letters or numbers,
  e.g. the name of the customer or the Serial Number of the generator:
  "dr-test.210"; "01834.alp"

- The extensions (extension of the file name):
  ".210"; ".alp"; ".opr"; ".cpr" may not be changed!

- File name and extension must be separated by a decimal point!

- The ability to enter additional information should be used fully when saving (succeeding colleagues will be grateful for this!);
  e.g.: "17.Feb.1995;Start-up.;IQ;Sch"

NOTICE **With FLUOROSPOT mode, the exposure data for this operating mode is stored in the FLUOROSPOT.**

Description

SDM (**S**elective **D**ominant **M**easuring) describes a system to detect the output brightness of the image intensifier for all indirect technique modes (fluoroscopy, DSA, DFR). The detector is a **PDA** (**P**hoto **D**iode **A**rray). It is used as the detector system, which basically takes over the function of the photo multiplier.

The **PDA** is comprised of individual semiconductor segments which are combined into ADR measuring fields. The measuring fields are can be selected parallel, comparable to Iontomat measuring fields. Selection of a circular measuring field is also possible, but this cannot be combined with the other fields.

The size of the measuring fields is switched automatically depending on the zoom format.

Checking the PDA Size

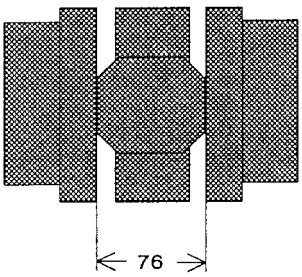
Prerequisites

The television system and the DFR system, if configured, must be operational.
The television camera must be centered on the image intensifier.

- Switch **SS OFF** in the generator.
- Move the unit into a convenient position so that housing on the I.I. attachment can be removed easily. If possible, remove the paneling screws now.
- In systems configured with DFR, mark the position of the brightness and contrast settings on the monitor and release the lock on the adjustment potentiometers.
- At the unit, leave fluoroscopy switched on for the following steps (for this, it may be necessary to secure the fluoro switch in place).
- Remove the housing from the I.I. attachment.
- Switch S1 on the D100 to "Service" (Fig.2); the PDA will be illuminated.

NOTICE

After approx. 4 minutes, the illumination for the PDA switches off automatically. To switch the light back on, the S1 on the D100 must be switched back briefly to "Normal".



76 mm applicable only for the 40 HDR I.I.

Fig. 1

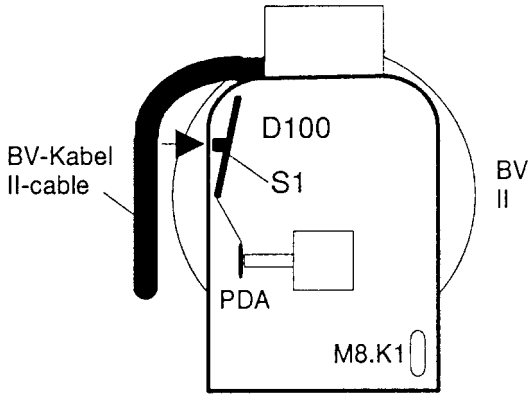


Fig. 2

- Turn the brightness and contrast controls on the monitor until the PDA is clearly visible. With DFR systems, store the LIH image if needed and change the windowing or edge enhancement.
- Measure the size of the PDA as shown in Fig.1 and compare the value with that in the Table.

In case of deviations procede with the section "Adjustting the Size of the PDA".

PDA measured at SIMOMED H - 44 cm

	40 cm I.I.	33 cm I.I.	23 cm I.I.	Urology 40cm I.I.	Urology 33cm I.I.
PDA size in mm	76	91	116	76	91
Tolerance in mm	+ / -7	+ / -9	+ / -11	+ / -7	+ / -9

- Switch **Fluoro OFF** at the unit.
- On the D100,set S1 back to "Normal".
- Install the cap on the I.I. attachment.
- Switch the **SS ON** at the generator.
- In systems with DFR, set the brightness and contrast controls on the monitor back to the marked position and lock the controls in place.

Adjusting the Size of the PDA

- As described in the previous paragraph, make the PDA visible on the monitor.
- Loosen the two Allen-head set screws on the PDA lens.
- Adjust the size of the PDA for the particular I.I. (see above table) by turning the lens (plastic ring).
- Retighten the Allen-head set screws.
- Switch **Fluoro OFF** at the unit.
- On the D100, set the S1 back to "Normal".
- Install the housing on the I.I. attachment.
- Switch **SS ON** at the generator.

Checking the Selected ADC Measuring Field

The dose rate must be adjusted as described in the chapter: "Adjustment" / "Dose Rate"

- Select left, rectangular measuring field at the unit control console.

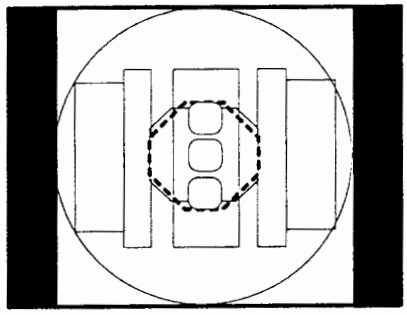
- Switch **Fluoro ON** at the unit.
- In systems configured with the universal collimator, move the DSA finger over the ADC measuring field (with Fluorospot H the measuring field is displayed on the monitor).
  In systems configured with the collimator without the DSA finger, place 2.1 mm Cu on the tabletop and move over the measuring field.

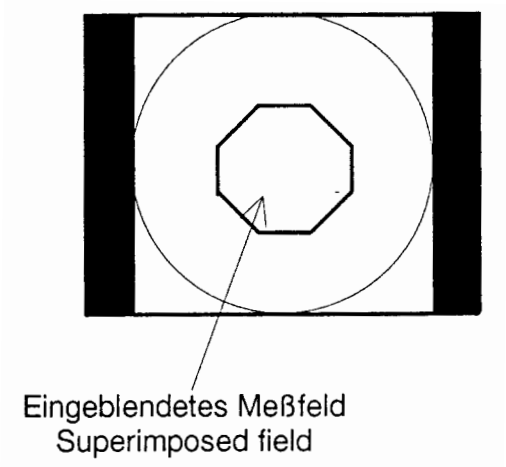
- At the generator control console, fluoro kV and fluoro mA must increase according to the particular fluoro curve.
- Repeat the test using the measuring field on the right.
- Switch **Fluoro OFF.**

Checking the Superimposed ADC Measuring Field with FLUROSPOT H

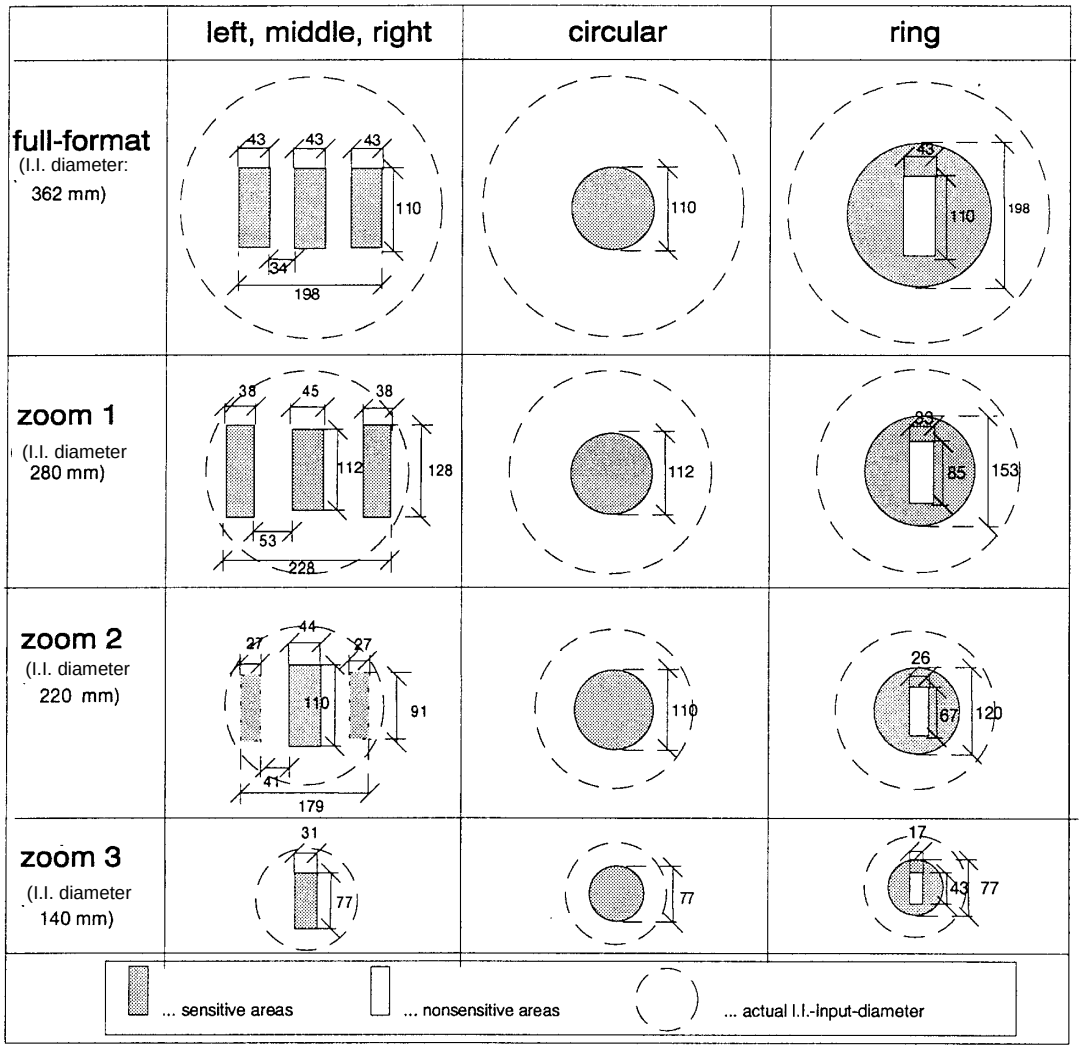
- Select I.I. full format and the round measuring field at unit.
- Make the PDA visible as described in the paragraph "Checking the PDA Size".
- Mark the width and center of the octagonal measuring field on the monitor (Fig.3).
- At the unit, switch **Fluoro ON**.
  The measuring field will be superimposed on the monitor by the FLUOROSPOT H for as long as was configured for the FLUORSPOT H in the system configuration.
  If the display time is not sufficient, it can be extended using the special function "System Adjustments".
- The width and position of the field must be identical with the mark. Permissible misalignment of size and position is 1 cm each (Fig.3).
- To change the size of the superimposed field, select the Fluorospot H system configuration, Mask 6, "Measurement field scale factor".

It is not possible to change the location of the superimposed field (Fig.4).





Measurement field sizes in zoom mode (RX unit with 40-4 HDR I.I.)



TD AX 6 / Scheuermeyer
TD AX 7 / Seel
TD AX 1 / Biedermann, Tropia